

[Amended pages 12, 13, 14 of EP 009909728]

Patent Claims

1. Safety vacuum cleaner with measuring system (10) for residual dust monitoring, which contains a housing (1), a turbine (5), a filter element (4) as well as an inlet- (2) and an outlet- channel (3), wherein in operation of the safety vacuum cleaner, by means of the turbine (5) the air stream burdened with dust particles is conveyed through the inlet channel (2) and through the filter element (4) into the outlet channel (3) and from there to the outside, characterized in that at least one measuring electrode (11) is mounted downstream of the air stream behind the filter unit (4), which measuring electrode (11) conducts a current aroused by contact tension between measuring electrode (11) and unfiltered dirt particles, in dependence on the particle distribution, to a measuring value processing unit (12), in which the unfiltered dust particles are essentially electrically not yet charged before contact with the measuring electrode (11).

2. Safety vacuum cleaner with measuring system (10) for residual dust monitoring according to claim 1, characterized in that the measuring electrode (11) is arranged downstream of the air stream behind the filter element (4) and downstream of the air stream behind the turbine (5).

3. Safety vacuum cleaner with measuring system (10) for residual dust monitoring according to claim 2, characterized in that the measuring electrode (11) is mounted at the free end of the outlet tube (3) inside this (tube).

4. Safety vacuum cleaner with measuring system (10) for residual dust monitoring according to claim 2, characterized in that the measuring electrode (11) is mounted in the vicinity of the turbine (5) in the outlet tube (3) or in the motor block of the turbine (5) itself.

5. Safety vacuum cleaner with measuring system (10) for residual dust monitoring according to claim 1, characterized in that the measuring electrode (11) is mounted downstream of the air stream behind the filter element (4) but in front of the turbine (5).

6. Safety vacuum cleaner with measuring system (10) for residual dust monitoring according to claim 5, characterized in that the measuring electrode (11) is mounted directly on, or in the vicinity of the output surface of the filter element (4), downstream of the air stream.

7. Safety vacuum cleaner with measuring system (10) for residual dust monitoring according to claim 5, characterized in that the measuring electrode (11) is mounted in an intermediate tube or an intermediate chamber between filter element (4) and turbine (5).

8. Safety vacuum cleaner with measuring system (10) for residual dust monitoring according to claim 5, characterized in that the measuring electrode (11) is mounted in the vicinity of the turbine blade in the turbine housing (5).

9. Safety vacuum cleaner with measuring system (10) for residual dust monitoring according to claims 1-8, characterized in that the measuring electrode (11) covers the entire flow cross-section.

10. Safety vacuum cleaner with measuring system (10) for residual dust monitoring according to claims 1-9, characterized in that the measuring electrode (11) is constructed in grid form and is mounted electrically insulated in the safety vacuum cleaner.

11. Safety vacuum cleaner with measuring system (10) for residual dust monitoring according to claims 1-10, characterized in that the turbine (5) is either directly or artificially grounded.

12. Safety vacuum cleaner with measuring system (10) for residual dust monitoring according to claims 1-11, characterized in that the housing (1) is either directly or artificially grounded.

13. Safety vacuum cleaner with measuring system (10) for residual dust monitoring according to claims 1-12, characterized in that in a differential amplifier (12) the measuring value processing of the measuring current is suitably amplified and conducted onward to a further processing unit.

14. Safety vacuum cleaner with measuring system (10) for residual dust monitoring according to claim 13, characterized in that the measuring value further-processing unit carries out beatwise a comparison of desired value and actual value and on undershooting or exceeding of the desired value delivers an alarm signal.

15. Safety vacuum cleaner with measuring system (10) for residual dust monitoring according to claim 14, characterized in that by this output signal an optical and/or acoustic alarm is given, and/or that the turbine (5) is switched off, and/or that an automatic changing of the filter element (4) and/or of the turbine (5) with filter element (4) is completed.

16. Safety vacuum cleaner with measuring system (10) for residual dust monitoring according to claims 1-15, characterized in that the measuring current is shown on a display, continuously or at intervals of time, either directly, or in the form of the correlating particle number, or in the form of a proportional filter blocking, or in the form of the degree of filter damage.

17. Safety vacuum cleaner with measuring system (10) for residual dust monitoring according to claims 1-16, characterized in that the value of the measuring current is registered into a storage unit, either continuously or at intervals of time, which storage unit is located in the safety vacuum cleaner itself or also externally.

18. Safety vacuum cleaner with measuring system (10) for residual dust monitoring according to claims 1-17, characterized in that the measuring value further-processing-unit is coupleable over an interface with an external data processing installation or a computer.